WHAT IS CLAIMED IS:

1. A surface acoustic wave resonator, comprising:

a piezoelectric plate;

an interdigital transducer to excite a surface acoustic wave in a propagation direction x on the piezoelectric plate; and

a pair of reflectors arranged on both sides of the interdigital transducer in a propagation direction;

the interdigital transducer being divided into three regions and including electrode fingers, the electrode fingers of the interdigital transducer of each region being formed at a fixed pitch which varies within 2%, the surface acoustic wave resonator possessing a single peak response, a form in which a vibration displacement envelope amplitude in the interdigital transducer region is normalized by its maximum value being a form which takes a maximum value 1 at a center position, which smoothly takes a value in a range of 0.33 to 0.53 at a position of 1/4 from both ends, and which smoothly takes a value in a range of 0.048 to 0.177 at positions at both ends.

2. The surface acoustic wave resonator according to Claim 1, regarding the array pitch of the interdigital transducer which is divided into three regions, the dimensions of the array pitch PTs of the interdigital transducer arranged on both sides, the array pitch PTc of the interdigital transducer arranged in the center, and the array pitch PR of the reflectors are set to satisfy the relation PR > PTs > PTc, the ratio PTc/PTs being in the range 0.985 to 0.996, and PR/PTs being in the range 1.0 to 1.01, and

Mc/M, which is a ratio of the number of pairs Mc of the interdigital transducer arranged in the center to the number of pairs M of the whole, being in the range 0.1 to 0.6.

3. The surface acoustic wave resonator according to Claim 1, the interdigital transducer and the reflectors being formed of aluminum metal, the interdigital transducer being formed of M pairs by assuming positive and negative electrodes to be one pair, the reflectors are formed of N electrode conductors, the total M + N being in the range 180 to 250, and the number of pairs M of the interdigital transducer being in the range 95 to 140,

the reflection coefficient γ of the surface acoustic wave per the electrode being in the range 0.005 to 0.015, and the total reflection coefficient Γ possessed by the entire interdigital transducer being $1.8 > \Gamma > 0.25$,

the closest distance between parallel conductors between the reflectors and the interdigital transducer being formed by a space from among the line and the space possessed by one pitch of the interdigital transducer,

the dimensions of the array pitch PTs of the interdigital transducer arranged on both sides, the array pitch PTc of the interdigital transducer arranged in the center, and the array pitch PR of the reflector being set to satisfy the relation PR > PTs > PTc, the ratio PTc/PTs being in the range 0.985 to 0.996, PR/PTs being in the range 1.0 to 1.01, and Mc/M, which is a ratio of the number of pairs Mc of the interdigital transducer arranged in the center to the total number of pairs M, being in the range 0.1 to 0.6.

4. The surface acoustic wave resonator according to Claim 1, the piezoelectric plate being a rotated ST-cut quartz-crystal plate in which a quartz-crystal rotated Y plate is rotated by a rotational angle $\theta = 31$ to 42 degrees in a counterclockwise direction about the electrical axis (X axis), and the propagation direction x of the surface acoustic wave being rotated in-plane in a range of 40 to 46 degrees from the electrical axis (X axis).

5. The surface acoustic wave resonator according to Claim 3, the total number of pairs M of the interdigital transducer being 100±5, the number of electrode conductors N of the reflector being in the range 80 to 140, the ratio PTc/PTs being in the range 0.995±0.001, and Mc/M, which is the ratio of the number of pairs Mc of the interdigital transducer arranged in the center to the total number of pairs M of the interdigital transducer, being 0.5±0.05.